MHD nad Kinetic Scale Turbulence in the magnetosheath of Saturn : Cassini Observation

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The shocked solar wind plasma upstream of the bowshock forms the magnetosheath. Through this region energy, mass and momentum are transported from the solar wind into the planet's magnetosphere, playing a crucial role in the solar-planet interactions. Hence, the planets' magnetosheath present a high level of turbulence, with a rich variety of wave and stochastic phenomena. While the magnetic turbulence of the terrestrial magnetosheath has been extensively studied, not so much work has been done regarding the planets magnetosheaths. Therefore, and in order to expand our knowledge on plasma turbulence, we investigate here the main properties of the plasma turbulence in the magnetosheath of Saturn using the Cassini spacecraft data and compare it with the well-explored terrestrial solar wind turbulence. These properties include the magnetic field energy spectra, the magnetic compressibility and intermittency, at both MHD and kinetic scales ones.The analysis is based on in-situ data provided by the Fluxgate Magnetometer of the MAG instrument, which measures the magnetic field data with 32ms time resolution and the plasma data from the CAPS/IMS (Cassini Plasma Spectrometer) and the Electron Spectrometer (ELS), during 39 shock-crossings between 2004 and 2005.

Similarities and differences were found between the different media, in particular about the nature of the turbulence and its scaling laws. These finding will be discussed along with theoretical implications on the modeling of space plasma turbulence.